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Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT

COUNTRY REPORTS

ETHIOPIA

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The Forest Resources Assessment Programme

Sustainably managed forests have multiple environmental and socio-economic functions important at the global, national and local scales, and play a vital part in sustainable development. Reliable and up-to-date information on the state of forest resources - not only on area and area change, but also on such variables as growing stock, wood and non-wood products, carbon, protected areas, use of forests for recreation and other services, biological diversity and forests' contribution to national economies - is crucial to support decision-making for policies and programmes in forestry and sustainable development at all levels.

FAO, at the request of its member countries, regularly monitors the world's forests and their management and uses through the Forest Resources Assessment Programme. This country report forms part of the Global Forest Resources Assessment 2005 (FRA 2005), which is the most comprehensive assessment to date. More than 800 people have been involved, including 172 national correspondents and their colleagues, an Advisory Group, international experts, FAO staff, consultants and volunteers. Information has been collated from 229 countries and territories for three points in time: 1990, 2000 and 2005.

The reporting framework for FRA 2005 is based on the thematic elements of sustainable forest management acknowledged in intergovernmental forest-related fora and includes more than 40 variables related to the extent, condition, uses and values of forest resources. More information on the FRA 2005 process and the results - including all the country reports - is available on the FRA 2005 Web site (www.fao.org/forestry/fra2005).

The Global Forest Resources Assessment process is coordinated by the Forestry Department at FAO headquarters in Rome. The contact person for matters related to FRA 2005 is:

Mette Løyche Wilkie
Senior Forestry Officer
FAO Forestry Department
Viale delle Terme di Caracalla
Rome 00100, Italy

E-mail: Mette.LoycheWilkie@fao.org

Readers can also use the following e-mail address: fra@fao.org

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The Global Forest Resources Assessment 2005 Country Report Series is designed to document and make available the information forming the basis for the FRA 2005 reports. The Country Reports have been compiled by officially nominated country correspondents in collaboration with FAO staff. Prior to finalisation, these reports were subject to validation by forestry authorities in the respective countries.

Report preparation and contact person

This report has been prepared by:

Name : **Leykun Berhanu (Mr.)**

Title:Team Leader, Forest Development and Conservation Team
Organization: **Ministry of Agriculture and Rural Development (MoARD)**
Address:
P.O.Box: 62161, Addis Ababa, Ethiopia
Tel: + 251-1-505127
Fax: + 251-1-514190
Email: **leykun.berhanu@telecom.net.et**

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1 Table T1 – Extent of Forest and Other wooded land

1.1 FRA 2005 Categories and definitions

Category	Definition
Forest	Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds *in situ*. It does not include land that is predominantly under agricultural or urban land use.
Other wooded land	Land not classified as "Forest", spanning more than 0.5 hectares; with trees higher than 5 meters and a canopy cover of 5-10 percent, or trees able to reach these thresholds *in situ*; or with a combined cover of shrubs, bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use.
Other land	All land that is not classified as "Forest" or "Other wooded land".
Other land with tree cover (Subordinated to "Other land")	Land classified as "Other land", spanning more than 0.5 hectares with a canopy cover of more than 10 percent of trees able to reach a height of 5 meters at maturity.
Inland water bodies	Inland water bodies generally include major rivers, lakes and water reservoirs.

1.2 National data

1.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Woody Biomass Inventory and Strategic Planning Project (WBISPP), Ministry of Agriculture and Rural Development, May 2004	H	Land use/ Land cover, Growing stock	Land sat TM images: 1986-1989 and 1995	Woody Biomass Inventory using remote sensing (satellite imagery) . Satellite images were used to derive estimates for 2000 and 2005. Several assumptions were made to arrive at estimates for 2005.
Ethiopian Forestry Action Program (EFAP), 1994, Ministry of Natural Resources and Environmental Protection.	M	Forest resource base	1992	EFAP' estimation of Ethiopia's forest resource base for 1992 was used.

1.2.2 Classification and definitions

National class	Definition
Forest	Land with relatively continuous cover of trees, which are evergreen or semi-deciduous, only being leafless for a short period, and then not simultaneously for all species. The canopy should preferably have more than one story.
High Wood Land	Combretum-Terminalia Woodland with trees >5 m and crown tree cover > 20%. It is found in East and West Wellega , Jima & Illubabor zone of Oromia region, in zone 2 of Gmbella Region, all of Benshangule -Gumuz Region, and west Gojam, Awi and north Gonder zone of Amhara region. In other areas, it is woodland lying above 1250m above sea level. This class does not include shrubs and bushes.
Plantation	Mainly Eucalyptus, Cupressus and Pinus plantation with >5 m and crown density > 20% & thus is included in "Forest " as defined by FAO
Low woodland	All other woodlands and shrubland <5m in height and with crown cover >20%
Other land	Other land is land area that is not categorized as forest. This includes agricultural land, settlements, etc

1.2.3 Original data

Table 1.2.3a Estimates for 2000 as obtained from the WBISPP report

Regions (1)	Forest	"High" Wood land	Plantation	Low Woodland + Shrubland	Other land	Water	Total
	ha	**ha**	**ha**	ha	ha	ha	ha
Oromiya	2205619	5257683	62770	9806112	18422447	260500	**36015130**
SNNPR	740271	560000	237198	1349431	7667390	152860	**10707150**
Gambella	491805	899578	0	422042	1371684	0	**3185109**
Dire Dawa	0	0	0	36635	92163	0	**128798**
Harari	216	0	0	7497	24839	0	**32552**
Amhara	92744	841896	199496	7863448	6456317	310379	**15764280**
Tigray	9332	0	649	2135637	2788537	6212	**4940367**
Beneshangul	68495	2471761	0	1416368	955145	15216	**4926985**
Afar	39197	0	0	3169871	6329065	82142	**9620275**
Somali	4257	18160	1410	20090489	9007056	968	**29122340**
Addis Ababa	0	-	7900	0	54450	0	**62350**
ETHIOPIA	**3651935**	**10049079**	**509422**	**46297530**	53169093	**828277**	**114505336**

NOTES:

(1) Low woodland and shrub land are included in the other land category in the WBISPP report. However, for the purpose of FRA 2005 report these two categories are separated.

Table 1.2.3.b Estimated figures for 2005 as projected by the WBISPP report

	Area in hectares						
Regions	**Forest**	**"High" Wood land**	**Plantation**	**Low Woodland + Shrubland**	**Other land**	**Water**	**Total**
Oromiya	2032012	4869511	62770	9806112	18984226	260500	**36015130**
SNNPR	638427	548480	237198	1349431	7780755	152860	**10707150**
Gambella	461586	899578	0	422042	939122	0	**3185109**
Dire Dawa	0	0	0	36635	92163	0	**128798**
Harari	216	0	0	7497	24839	0	**32552**
Amhara	84466	841896	199496	7863448	6464595	310379	**15764280**
Tigray	9332	0	649	2135637	2788537	6212	**4940367**
Beneshangul	68495	2454991	0	1416368	971915	15216	**4926985**
Afar	39197	0	0	3169871	6329065	82142	**9620275**
Somali	4257	18160	1410	20090489	9007056	968	**29122340**
Addis Ababa	0	-	7900	0	54450	0	**62350**
ETHIOPIA	**3337988**	**9632616**	**509422**	**46297530**	**53436723**	**828277**	**114505336**

Notes:

Low woodland and shrub land are included in other land category in the WBISPP report. However, for the purpose of FRA 2005 report these two categories are separated.

Summary of 2000 and 2005 data as taken from the WBISPP report

	Area in hectares	
National Categories	**2000**	**2005**
Forest	3 651 935	3 337 988
High woodland area	10 049 079	9 632 616
Plantations	509 422	509 422
Low woodland + Shrubland	46 297 530	46 297 530
Other land	53 169 093	53 899 503
Inland Water	82 8277	828 277
Total	114 505 336	114 505 336

1.3 Analysis and processing of national data

1.3.1 Calibration

	UN/FAO	National data
Land Area in hectares	100 000 000	113 677 059
Inland Water in ha	10 430 00	828 277
Total Country Area (1)	110 430 000	114 505 336
Calibration factor	0.9644092	

Notes:

Calibration is done for the total country area since the figure of inland water estimated using the UN /FAO figures for total inland water is considered unrealistically high.

Results after Calibration

National Classes	Area in hectares	
	2000	**2005**
Forest	3 521 960	3 219 186
High woodland area	9 691 424	9 289 784
Plantations	491 291	491 291
Low woodland + Shrubland	44 649 764	44 649 764
Other land	51 276 763	51 981 177
Inland water	798 798	798 798
Total	**110 430 000**	**110 430 000**

1.4 Reclassification into FRA 2005 classes

Reclassification is done before estimation and forecasting.

Reclassification	Forest	OWL	OL	Inland water
Forest	100%			
High woodland area	100%			
Plantations	100%			
Low woodland + Shrubland		100%		
Other land			100%	
Inland water				100%

Reclassification of 2000 data

National Classes	Area in hectares			
	Forests	**OWL**	**Other land**	**Inland water**
Forest	3 521 960			
High woodland area	9 691 424			
Plantations	491 291			
Low woodland + Shrubland		**44 649 764**		
Other land			51 276 763	
Inland water				798 798
Total	**13 704 675**	**44 649 764**	**51 276 763**	**798 798**

Results after reclassification 2000 and 2005 data

FRA 2005 Category	Area in hectares	
	2000	**2005**
Forests	**13 704 675**	**13 000 261**
OWL	44 649 764	44 649 764
OL	51 276 763	51 981 177
Inland water	798 798	798 798
Total country area	110 430 000	110 430 000

1.4.1 Estimation and forecasting

FRA 2005 Category	Area in hectares		
	1990	**2000**	**2005**
Forests	15 113 503	13 704 675	13 000 261
OWL	44 649 764	44 649 764	44 649 764
OL	49 867 935	51 276 763	51 981 178
Inland water	798 798	798 798	798 798
Total country area	110 430 000	110 430 000	110 430 000

1990 is estimated through linear extrapolation

1.5 Data for National reporting table T1

FRA 2005 Categories	Area (1000 hectares)		
	1990	**2000**	**2005**
Forest	15 114	13 705	13 000
Other wooded land	44 650	44 650	44 650
Other land	49 868	51 277	51 981
...of which with tree cover [1)]			
Inland water bodies	799	799	799
TOTAL	110 430	110 430	110 430

1.6 Comments to National reporting table T1

(1) There are major differences between the 1997 report, which was used to compile the FRA 2000 report and the latest woody resource biomass inventory data, which were submitted for the FRA 2005 report. The first difference is in terms of national classes. The old inventory (1997) had open forests and closed forest totalling an estimated five million hectares. The latest inventory (2000) reports forest, high woodland and plantations totalling an estimated 13 million hectares (See original data table above), primarily because the class high woodland has now been classified as “forests” since, it meets the criteria. The second difference is in terms of the definitions, where the area with tree cover between 5-10% covered only “shrubs” in 1997 and now the 2000 woody resource biomass study includes “shrubs” and “low woodland” under these definitions. For example, the 1997 report, reported an estimated 31 million hectares for shrubs and the latest study estimated 46 million hectares for low woodland and shrubs. The other difference is in terms of the area reported under other land, this may suggest that some of the land with a tree cover between 5-10% were reclassified as OWL in the latest study. These differences are bound to create big differences between the reported forest cover in the FRA 2000 and the current FRA 2005 report.

(2) Land use/Land cover data was obtained from satellite images dating from 1986-1989 for part of the country (250 000km2). Methodology was developed and used to calculate deforestation of natural forests

and woodland up to year 2000. Again, land use/land cover data was obtained from satellite imagery dating from 1995 for the rest part of the country. The result of the two analyses makes the data for year 2000.

(3) In order to forecast for year 2005 the future rate of deforestation caused by expanding population and its needs for agriculture land etc. the analysis made a number of assumptions in order to come up to year 2005.

(4) Methodology used by WBISPP to forecast deforestation of natural forests and woodland is the following:

- Forest cover according to national classification:

WBISPP has recognized three classes of forest based on the percentage crown cover:
Closed: crown cover of the upper stratum exceeds 80 percent
Dense: crown cover of the upper strata is between 50 to 80 percent
Open: crown cover of the upper stratum is between 20 to 50 percent.

5) The project estimates that the total area under forest according to national definitions for the year 2000 and 2005 is 4 073 213 ha and 2 699 561 ha respectively. (Please refer table 1.2.3a and 1.2.3b of T1 (1.2.3 Original data: National category)). From the total forest areas, it is assumed that Closed, dense and open forests cover 20 17 and 63 percents respectively.

6) The "original data" for the year 1989 and 2000 are based on the forest area of 1989 (for Oromiya SNNPR and Gambella Regions) and 2000 (the remaining eight Regions). Therefore based on the forest area of 1989 and considering deforestation (from 1989 – 2000) the result was directly given in Table 1.2.3a for the year 2000 and Table 1.2.3b for the year 2005 by WBISPP for all Regions. The analysis was conducted at the wereda level and then aggregated to Administrative Zone and then Region. In order to forecast the future rate of deforestation caused by expanding population and its need for agricultural land the analysis made a number of assumptions:

(i) It was assumed that agriculture first would expand into non-forested areas, which were suitable for cropping - successively into grassland then Shrubland then woodland - because of the ease of clearing.
(ii) Once all grassland Shrubland and woodland had been cleared then people would start to move into the natural forest.
(iii) The number of farm families was assumed to increase at the medium annual rate of increase as forecast by the CSA's 1994 Population and Housing Census for the Region concerned.
(iv) Migration from other weredas either nearby or further away was not taken into consideration because of the current lack of data at the wereda or Zonal level on migration patterns and rates.
(v) Each family was assumed to clear the area required for cropping (as determined in the Project's Socio-economic Survey) and an equal amount for settlement and livestock grazing.
(vi) It was assumed that areas of forest with slopes over 30% would not be cleared for agriculture.
(vii) It was assumed that some Regional Forest Areas would have full protection as follows:

- Arero
- Chilimo Gagi
- Gara Muleta
- Megada
- Menegesha-Suba
- Munessa-Shashamene
- Tiro-Boter-Becho
- Yabello
- Yerer
- Zukwala

(viii) No account was taken of clearing or thinning of forest for coffee plantation. It is know that there are some medium scale coffee plantations (e.g. at Bebeka and Tepi in SNNP Region) are being developed in some areas but the scale of this development is not known.

7) No account was taken of the establishment of additional plantations which may off-set part of the estimated deforestation rate of 140 000 ha per year. However, no reliable information exists on the annual rate of new plantations.

2 Table T2 – Ownership of Forest and Other wooded land

2.1 FRA 2005 Categories and definitions

Category	Definition
Private ownership	Land owned by individuals, families, private co-operatives, corporations, industries, religious and educational institutions, pension or investment funds, and other private institutions.
Public ownership	Land owned by the State (national, state and regional governments) or government-owned institutions or corporations or other public bodies including cities, municipalities, villages and communes.
Other ownership	Land that is not classified either as “Public ownership” or as “Private ownership”.

2.2 National data

2.2.1 Data sources

2.2.2 Classification and definitions

All forests are publicly owned

2.2.3 Original data

2.3 Analysis and processing of national data

2.4 Reclassification into FRA 2005 classes

2.5 Data for National reporting table T2

FRA 2005 Categories	Area (1000 hectares)			
	Forest		Other wooded land	
	1990	2000	1990	2000
Private ownership				
Public ownership	15 114	13 705	44 650	44 650
Other ownership				
TOTAL	**15 114**	**13 705**	**44 650**	**44 650**

2.6 Comments to National reporting table T2

All forestlands (13705 ha) in the year 2000 belong to the public according to the report of WBISPP. Therefore, it is assumed that in the year 1990 forestlands also belong to the public (Public ownership type).

3 Table T3 – Designated function of Forest and Other wooded land

3.1 FRA 2005 Categories and definitions

Types of designation

Category	Definition
Primary function	A designated function is considered to be primary when it is significantly more important than other functions. This includes areas that are legally or voluntarily set aside for specific purposes.
Total area with function	Total area where a specific function has been designated, regardless whether it is primary or not.

Designation categories

Category / Designated function	Definition
Production	Forest / Other wooded land designated for production and extraction of forest goods, including both wood and non-wood forest products.
Protection of soil and water	Forest / Other wooded land designated for protection of soil and water.
Conservation of biodiversity	Forest / Other wooded land designated for conservation of biological diversity.
Social services	Forest / Other wooded land designated for the provision of social services.
Multiple purpose	Forest / Other wooded land designated to any combination of: production of goods, protection of soil and water, conservation of biodiversity and provision of social services and where none of these alone can be considered as being significantly more important than the others.
No or unknown function	Forest / Other wooded land for which a specific function has not been designated or where designated function is unknown.

3.2 National data

3.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Ethiopian Forestry Action Programme (EFAP) 1994 Ministry of Natural Resources & Environmental Protection	M	Report	1992	

3.2.2 Classification and definitions

3.2.3 Original data

There are no protected forests (gazetted/demarcated) in Ethiopia, as all forests are considered multi-purpose. The areas under plantation in FRA 2000 was reported as 216 000 ha. According to the FRA report, the NRMRD (1998) gave the total plantation area in 1992 as 200 000 ha and the annual planting rate as 2000 ha. Applying the annual rate to the total as of 1992, the total area for 2000 was estimated at 216 000ha. There has since been a new inventory that was undertaken by the WBISPP. In this report, the plantation area in 2000 was estimated at 509 422 ha (see table T1). The plantation area, equalling 491 000 ha after calibration and designated for production, was assumed the same for all reporting years due to lack of other information.

3.3 Analysis and processing of national data

3.3.1 Calibration

3.3.2 Estimation and forecasting

3.4 Reclassification into FRA 2005 classes

3.5 Data for National reporting table T3

FRA 2005 Categories / Designated function	Area (1000 hectares)					
	Primary function			Total area with function		
	1990	2000	2005	1990	2000	2005
Forest						
Production	491	491	491			
Protection of soil and water						
Conservation of biodiversity						
Social services						
Multiple purpose	14 622	13 213	12 509	not appl.	not appl.	not appl.
No or unknown function				not appl.	not appl.	not appl.
Total - Forest	**15 114**	**13 705**	**13 000**	**not appl.**	**not appl.**	**not appl.**
Other wooded land						
Production						
Protection of soil and water						
Conservation of biodiversity						
Social services						
Multiple purpose	44 650	44 650	44 650	not appl.	not appl.	not appl.
No or unknown function				not appl.	not appl.	not appl.
Total – Other wooded land	44 650	44 650	44 650	**not appl.**	**not appl.**	**not appl.**

3.6 Comments to National reporting table T3

There is no forest designation as per FAO definition. However, according to expertise knowledge all plantations are designated for production and other forests/other woodlands for multiple purposes.

4 Table T4 – Characteristics of Forest and Other wooded land

4.1 FRA 2005 Categories and definitions

Category	Definition
Primary	Forest / Other wooded land of native species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed.
Modified natural	Forest / Other wooded land of naturally regenerated native species where there are clearly visible indications of human activities.
Semi-natural	Forest / Other wooded land of native species, established through planting, seeding or assisted natural regeneration.
Productive plantation	Forest / Other wooded land of introduced species, and in some cases native species, established through planting or seeding mainly for production of wood or non-wood goods.
Protective plantation	Forest / Other wooded land of native or introduced species, established through planting or seeding mainly for provision of services.

4.2 National data

There are no national data available, however, in almost all forests and woodlands areas there is human intervention. In this context, forests and other wooded land are considered as modified natural and all plantations as productive plantations.

4.3 Analysis and processing of national data

4.4 Reclassification into FRA 2005 classes

4.5 Data for National reporting table T4

FRA 2005 Categories	Area (1000 hectares)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Primary						
Modified natural	14 622	13 213	12 509	44 650	44 650	45 073
Semi-natural						
Productive plantation	491	491	491			
Protective plantation						
TOTAL	**15 114**	**14 826**	**12 526**	44 650	44 650	45 073

4.6 Comments to National reporting table T4

5 Table T5 – Growing stock

5.1 FRA 2005 Categories and definitions

Category	Definition
Growing stock	Volume over bark of all living trees more than X cm in diameter at breast height (or above buttress if these are higher). Includes the stem from ground level or stump height up to a top diameter of Y cm, and may also include branches to a minimum diameter of W cm.
Commercial growing stock	The part of the growing stock of species that are considered as commercial or potentially commercial under current market conditions, and with a diameter at breast height of Z cm or more.

5.2 National data

5.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
WBISPP May 2004	H	Land use/ Land cover	1986-1989 and 1995	Woody Biomass Inventory and Strategic Planning Project using remote sensing (satellite imagery)

5.2.2 Classification and definitions

5.2.3 Original data

As no growing stock data are available, growing stock has been estimated from the following above-ground biomass figures presented in T6:

FRA 2005 Categories	1990	2000	2005
Above-ground biomass Forest (1000 tonnes)	484 216	425 639	396 351
Above-ground biomass Other wooded land (1000 tonnes)	364 967	364 967	364 967

5.3 Analysis and processing of national data

Growing stock has been estimated from the above-ground biomass figures in T6 by using the following formula and applying default conversion factors.

GS = AGB / BEF / WD / 1000

GS = Growing stock (million m3)
AGB = Above-ground biomass (1000 tons)
BEF = Biomass expansion factor = 2.4 for Forest, and 6.1 for Other wooded land
WD = Wood density = 0.58

Furthermore, Commercial growing stock is assumed to be 25% of the total growing stock on forest land and zero on Other wooded land

The result of the calculations are presented in the final reporting table below

5.4 Data for National reporting table T5

FRA 2005 Categories	Forest			Other wooded land		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**
Growing stock	347.9	305.8	284.7	103.2	103.2	103.2
Commercial growing stock	87.0	76.4	71.2			

Thresholds used by the country in the above tables are the following values

Specification of country threshold values	**Unit**	**Value**	**Complementary information**
1. Minimum diameter at breast height of trees included in Growing stock (X)	cm		
2. Minimum diameter at the top end of stem (Y) for calculation of Growing stock	cm		
3. Minimum diameter of branches included in Growing stock (W)	cm		
4. Minimum diameter at breast height of trees in Commercial growing stock (Z)	cm		
5. Volume refers to “Above ground” (AG) or “Above stump” (AS)	AG / AS		
6. Have any of the above thresholds (points 1 to 4) changed since 1990	Yes/No		
7. If yes, then attach a separate note giving details of the change	Attachment		

6 Table T6 – Biomass stock

6.1 FRA 2005 Categories and definitions

Category	Definition
Above-ground biomass	All living biomass above the soil including stem, stump, branches, bark, seeds, and foliage.
Below-ground biomass	All living biomass of live roots. Fine roots of less than 2mm diameter are excluded because these often cannot be distinguished empirically from soil organic matter or litter.
Dead wood biomass	All non-living woody biomass not contained in the litter, either standing, lying on the ground, or in the soil. Dead wood includes wood lying on the surface, dead roots, and stumps larger than or equal to 10 cm in diameter or any other diameter used by the country.

6.2 National data

6.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
WBISPP. 2004	M	Land use/ land cover	1986-1989 and 1995	Woody Biomass Inventory and Strategic Planning Project using remote sensing (satellite imagery)

6.2.2 Classification and definitions

6.2.3 Original data

	Stem biomass *) (tons/ha)	Calibrated area from T1 (hectares) 2000	2005
Shrub + low wooded land	1.34	44,649,764	44,649,764
High woodland	3.57	9,691,424	9,289,784
Forest	35.57	3,521,960	3,219,186
Plantations	**)	491,291	491,291
Total area - Forest		**13,704,675**	**13,000,261**
Total area - Other wooded land		**44,649,764**	**44,649,764**

*) The data source is not clear, but it is assumed that the given values refer to stem biomass
**) No biomass data are given for plantations, it is assumed to be the same as for Forest

The following conversion factors have been used for calculating biomass for forests:

Biomass expansion factor	2.4	(average for temperate broadleaved and tropical broadleaved)
Root/shoot ratio	0.27	(tropical/subtropical dry forest)
Dead/live ratio	0.14	(deciduous forest)

The following conversion factors have been used for calculating biomass for shrubs and other woodlands:

Biomass expansion factor	6.1	(average for temperate broadleaved and tropical broadleaved)
Root/shoot ratio	0.48	Tropical Shrubland
Dead/live ratio	0.14	(deciduous forest)

6.3 Analysis and processing of national data

The biomass figures per hectare are multiplied with respective areas and extrapolated for estimating data for 1990. Plantations, Forest and High woodland are reclassified as Forest according to FRA 2005 classification, while Shrub + low wooded land is reclassified as other wooded land.

	Above-ground biomass (1000 tons)		
	1990	**2000**	**2005**
Shrub + low wooded land	364,967	364,967	364,967
High woodland	89,919	83,036	79,595
Forest	352,357	300,663	274,815
Plantations	41,941	41,941	41,941
Total Forest	**484,216**	**425,639**	**396,351**
Total Other wooded land	**364,967**	**364,967**	**364,967**

Applying the conversion factors to the aboveground biomass gives the final data for the reporting table T6.

6.4 Data for National reporting table T6

	Biomass (million metric tonnes oven-dry weight)					
	Forest			**Other wooded land**		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**
Above-ground biomass	484	426	396	365	365	365
Below-ground biomass	131	115	107	175	175	175
Total living Biomass	**615**	**541**	**503**	**540**	**540**	**540**
Dead wood biomass	86	76	70	76	76	76
TOTAL	**701**	**616**	**574**	**616**	**616**	**616**

7 Table T7 – Carbon stock

7.1 FRA 2005 Categories and definitions

Category	Definition
Carbon in above-ground biomass	Carbon in all living biomass above the soil, including stem, stump, branches, bark, seeds, and foliage.
Carbon in below-ground biomass	Carbon in all living biomass of live roots. Fine roots of less than 2 mm diameter are excluded, because these often cannot be distinguished empirically from soil organic matter or litter.
Carbon in dead wood biomass	Carbon in all non-living woody biomass not contained in the litter, either standing, lying on the ground, or in the soil. Dead wood includes wood lying on the surface, dead roots, and stumps larger than or equal to 10 cm in diameter or any other diameter used by the country.
Carbon in litter	Carbon in all non-living biomass with a diameter less than a minimum diameter chose by the country for lying dead (for example 10 cm), in various states of decomposition above the mineral or organic soil. This includes the litter, fumic, and humic layers.
Soil carbon	Organic carbon in mineral and organic soils (including peat) to a specified depth chosen by the country and applied consistently through the time series.

7.2 National data

7.2.1 Original data

No original data exists. Input for this table was obtained from T6 and IPCC factor of 50% was applied to convert biomass to carbon in biomass.

7.3 Data for National reporting table T7

FRA 2005 Categories	Carbon (Million metric tonnes)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Carbon in above-ground biomass	242	213	198	182	182	182
Carbon in below-ground biomass	65	57	54	88	88	88
Sub-total: Carbon in living biomass	**307**	**270**	**252**	**270**	**270**	**270**
Carbon in dead wood	43	38	35	38	38	38
Carbon in litter	ID	ID	ID	ID	ID	ID
Sub-total: Carbon in dead wood and litter	ID	ID	ID	ID	ID	ID
Soil carbon to a depth of __ cm	ID	ID	ID	ID	ID	ID
TOTAL CARBON	**351**	**308**	**287**	**308**	**308**	**308**

8 Table T8 – Disturbances affecting health and vitality

8.1 FRA 2005 Categories and definitions

Category	Definition
Disturbance by fire	Disturbance caused by wildfire, independently whether it broke out inside or outside the forest/OWL.
Disturbance by insects	Disturbance caused by insect pests that are detrimental to tree health.
Disturbance by diseases	Disturbance caused by diseases attributable to pathogens, such as a bacteria, fungi, phytoplasma or virus.
Other disturbance	Disturbance caused by other factors than fire, insects or diseases.

8.2 National data

8.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
MoARD 2004	L	Forest cover report	2000-2004	

8.2.2 Original data

Year	Area affected by fire (1000ha)	
	Forests	Other wooded land *
1988	--------	100
1989	--------	100
1990	1.072	100
1991	0.153	100
1992	0.032	100
1998	------	100
1999	------	100
2000	150	100
2001	2.9	100
2002	------	100

* It is expert estimation

8.3 Analysis and processing of national data

8.3.1 Estimation and forecasting

8.4 Reclassification into FRA 2005 classes

8.5 Data for National reporting table T8

FRA-2005 Categories	Average annual area affected (1000 hectares)			
	Forests		Other wooded land	
	1990	2000	1990	2000
Disturbance by fire	N.S	N.S	100	100
Disturbance by insects	ID	ID		
Disturbance by diseases	ID	ID		
Other disturbance	ID	ID		

Notes:
N.S= Non significant.

The area of forests affected by fire was considered to be too little to significantly affect the total forest area

8.6 Comments to National reporting table T8

9 Table T9 – Diversity of tree species

9.1 FRA 2005 Categories and definitions

Category	Definition
Number of native tree species	The total number of native tree species that have been identified within the country.
Number of critically endangered tree species	The number of native tree species that are classified as "Critically endangered" in the IUCN red list.
Number of endangered tree species	The number of native tree species that are classified as "Endangered" in the IUCN red list.
Number of vulnerable tree species	The number of native tree species that are classified as "Vulnerable" in the IUCN red list.

9.2 National data

9.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
a) Institute of Biodiversity Conservation	H	number of species Endangered Vulnerable	2000-2004	

9.2.2 Classification and definitions

9.2.3 Original data

National	Number of species (year 2000)
Native tree species	1027
Critically endangered tree species	-
Endangered tree species	1
Vulnerable tree species	23

Source: Institute of Biodiversity Conservation

9.3 Data for National reporting table T9

FRA 2005 Categories	**Number of species (year 2000)**
Native tree species	1027
Critically endangered tree species	-
Endangered tree species	1
Vulnerable tree species	21

9.4 Comments to National reporting table T9

The number of native tree species could not be distinguished from the total number of woody species (including shrubs) although from a rough estimate it is possible to say that the number of native tree species is between 200 and 400.

10 Table T10 – Growing stock composition

10.1 Data for National reporting table T10

FRA 2005 Categories / Species name (Scientific name and common name)	**Growing Stock in Forests (million cubic meters)**	
	1990	**2000**
Name of 1st most common species	ID	ID
Name of 2nd most common species	ID	ID
Name of 3rd most common species	ID	ID
Name of 4th most common species	ID	ID
Name of 5th most common species	ID	ID
Name of 6th most common species	ID	ID
Name of 7th most common species	ID	ID
Name of 8th most common species	ID	ID
Name of 9th most common species	ID	ID
Name of 10th most common species	ID	ID
Remainder of species	ID	ID
TOTAL		

10.2 Comments to National reporting table T10

Forest inventory data for the above Categories is not available.

11 Table T11 – Wood removal

11.1 FRA 2005 Categories and definitions

Category	Definition
Industrial wood removal	The wood removed (volume of roundwood over bark) for production of goods and services other than energy production (woodfuel).
Woodfuel removal	The wood removed for energy production purposes, regardless whether for industrial, commercial or domestic use.

11.2 National data

11.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
FAO Forestry Statistics Series 171; FAO 2001		Industrial wood Fuelwood	1993-2002	

11.2.2 Classification and definitions

11.2.3 Original data

FRA Categories	Volume under bark in cubic meters				
	1993	1994	1995	1996	1997
Industrial Roundwood	2 145 000	2 219 000	2 295 800	2 430 000	2 397 800
Wood Fuel	76 337 074	78 550 402	80 231 664	81 220 592	83 106 686
	1998	1999	2000	2001	2002
Industrial Roundwood	2 397 300	2 454 300	2 459 000	2 457 600	2 458 400
Wood Fuel	84 134 597	85 785 168	87 471 092	88 824 543	90 201 752

11.3 Analysis and processing of national data

11.3.1 Estimation and forecasting

	Avg 93-97		Avg 98-02	
	1990	1995	2000	2005
Industrial Roundwood	2 149 720	2 297 520	2 445 320	2 593 120
Wood Fuel	72 495 137	79 889 284	87 283 430	94 677 577

Multiplying by Bark Factor 1.15 to convert to over bark

	Avg 93-97		Avg 98-02	
	1990	1995	2000	2005
Industrial Roundwood	2 472	2 642	2 812	2 982
Wood Fuel	83 369	91 873	100 376	108 879

11.4 Reclassification into FRA 2005 classes

11.5 Data for National reporting table T11

FRA 2005 Categories	Volume in 1000 cubic meters of round wood over bark					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial round wood	2 472	2 812	2 982			
Wood fuel	83 369	100 376	108 879			
TOTAL for Country	**85 842**	**103 188**	**111 861**			

Note:
1990 and 2005 figures obtained through extrapolation

11.6 Comments to National reporting table T11

It is not clear whether the above figures are total for forests and other wooded land

12 Table T12 – Value of wood removal

12.1 FRA 2005 Categories and definitions

Category	Definition
Value of industrial wood removal	Value of the wood removed for production of goods and services other than energy production (woodfuel).
Value of woodfuel removal	Value of the wood removed for energy production purposes, regardless whether for industrial, commercial or domestic use.

12.2 National data

12.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
WBISSP	H	Fuel wood price	2003	
Expert opinion: Ministry of Agriculture and Rural Development (MoARD**)**	H	Round wood price	2000	

12.2.2 Classification and definitions

12.2.3 Original data

Round wood price for all years =25 USD/M^3
Price of fuel wood: USD 5.894/ M^3*1412236 M^3 = USD 8324129

12.3 Analysis and processing of national data

12.3.1 Estimation and forecasting

12.4 Reclassification into FRA 2005 classes

12.5 Data for National reporting table T12

FRA 2005 Categories	Value of round wood removal (1000 USD)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial round wood	61 804	70 303	74 552			
Wood fuel	491 379	591 616	641 734			
TOTAL for Country	**553 184**	**661 919**	**716 286**			

12.6 Comments to National reporting table T12

Price for round wood is expertise assumption based upon the average price of different species at different areas/time.

13 Table T13 – Non-wood forest product removal

13.1 FRA 2005 Categories and definitions

The following categories of non-wood forest products have been defined:

Category
Plant products / raw material
1. Food
2. Fodder
3. Raw material for medicine and aromatic products
4. Raw material for colorants and dyes
5. Raw material for utensils, handicrafts & construction
6. Ornamental plants
7. Exudates
8. Other plant products
Animal products / raw material
9. Living animals
10. Hides, skins and trophies
11. Wild honey and bee-wax
12. Bush meat
13. Raw material for medicine
14. Raw material for colorants
15. Other edible animal products
16. Other non-edible animal products

13.2 National data

13.2.1 Data sources

Existing data source address only the category exudates. Exudates include Natural Gums. That is Gum arabic (from Acacia senegal and Aseyal) and Other Natural Gums (from *Boswellia papyrifera, B.ogadensis B. rivae* and mainly from *Commiphora myrrha.*

References to sources of information	**Quality (H/M/L)**	**Variable(s)**	**Year(s)**	**Additional comments**
Ethiopian Export Promotion Agency Report	H		1994 - 2004	Provides export data of Natural Gum products
Commercial Bank of Ethiopia Report	H		2004	Same as above
Ethiopian Forestry Action Program (EFAP)	M		1984-85	Provides information based on expert knowledge

13.2.2 Classification and definitions

13.2.3 Original data

Export value and quantity of Natural Gums

Year	Gum arabic		Other Natural Gums		TOTAL		Source
	Quantity (kg)	Value (Birr)	Quantity (kg)	Value (Birr)	Quantity (kg)	Value (Birr)	
1988	210 976	ID	1 299 581		1 510 557	ID	EEPA
1989	101 200	ID	653 555		754 755	ID	EEPA
1990	97 602	ID	295 270		392 872	ID	EEPA
1991	75 201	ID	284 312		359 513	ID	EEPA
1992	-		1 897 500			ID	EEPA
1994	267980	4443133	317250	4336486	585230	8779619	EEPA
1995	310000	1661730	623035	6632501	933035	8294231	EEPA
1996	-	-	853120	12356389	853120	12356389	EEPA
1997	30000	378140	2106252	20621493	2136252	20999633	EEPA
1998	29660	297541	1426718	14404448	1456378	14701989	EEPA
1999	15000	147704	1579376	18268082	1594376	18415786	EEPA
2000	-	-	2078572	24222682	2078572	24222682	EEPA
2001	830100	9964191	1208647	13945315	2038747	23909507	EEPA
2002	874672	10738644	1501978	17661176	2376650	28399821	EEPA
2003	380875	5380585	2338765	30237751	2719640	35618337	EEPA
2004 *	95711	699715.37	1620960	17991589.97	1716671	18691305.34	CBE
2005	238293	1742090	3040395	33746383	3278688	35488473	Forecasts

EEPA= Ethiopian Export Promotion Agency and CBA= Commercial Bank Of Ethiopia
* Export data of the year 2004 could be subjected to change in the course of the year.

13.3 Analysis and processing of national data

All the above figures refer to exudates.

13.3.1 Estimation and forecasting

The figure for 1990 is five year average from 1988 to 1992. The figure for 2000 is five year average from 1998 to 2002. The figure for 2005 is a forecast done by the country based on expert opinion.

13.4 Data for National reporting table T13

FRA 2005 Categories	**Scale factor**	**Unit**	**NWFP removal**		
			1990	**2000**	**2005**
Plant products / raw material					
1. Food					
2. Fodder					
3. Raw material for medicine and aromatic products					
4. Raw material for colorants and dyes					
5. Raw material for utensils handicrafts & construction					
6. Ornamental plants					
7. EXUDATES	**1000**	**kg**	**983**	**3 993**	**6 557**
8. Other plant products					
Animal products / raw material					
9. Living animals					
10. Hides skins and trophies					
11. Wild honey and bee-wax					
12. Bush meat					
13. Raw material for medicine					
14. Raw material for colorants					
15. Other edible animal products					
16. Other non-edible animal products					

13.5 Comments to National reporting table T13

For other categories/items, there is no sufficient data because the commodities are scattered among different institutions/enterprises.

14 Table T14 – Value of non-wood forest product removal

14.1 FRA 2005 Categories and definitions

The following categories of non-wood forest products have been defined:

Category
Plant products / raw material
1. Food
2. Fodder
3. Raw material for medicine and aromatic products
4. Raw material for colorants and dyes
5. Raw material for utensils, handicrafts & construction
6. Ornamental plants
7. Exudates
8. Other plant products
Animal products / raw material
9. Living animals
10. Hides, skins and trophies
11. Wild honey and bee-wax
12. Bush meat
13. Raw material for medicine
14. Raw material for colorants
15. Other edible animal products
16. Other non-edible animal products

14.2 National data

Year	Gum Arabic		Other Natural Gums		TOTAL		Source
	Quantity (kg)	Value (Birr)	Quantity (kg)	Value (Birr)	Quantity (kg)	Value (Birr)	
1994	267980	4443133	317250	4336486	585230	8779619	EEPA
1995	310000	1661730	623035	6632501	933035	8294231	EEPA
1996	-	-	853120	12356389	853120	12356389	EEPA
1997	30000	378140	2106252	20621493	2136252	20999633	EEPA
1998	29660	297541	1426718	14404448	1456378	14701989	EEPA
Total	637640	6780544	5326375	58351317	5964015	**65131861**	
1999	15000	147704	1579376	18268082	1594376	18415786	EEPA
2000	-	-	2078572	24222682	2078572	24222682	EEPA
2001	830100	9964191	1208647	13945315	2038747	23909507	EEPA
2002	874672	10738644	1501978	17661176	2376650	28399821	EEPA
2003	380875	5380585	2338765	30237751	2719640	35618337	EEPA
Total	2100647	26231124	8707338	104335006	10807985	**130566133**	

Five-year average from the table above gives the following for 1997 and 2001:

Value	Five year average (1994-1998	Five year average91999-2003)	Exchange-rate	
	1996	**2001**	**1997**	**2001**
(Birr)	13026372	26113227	7.503	8.558

14.3 Analysis and processing of national data

14.3.1 Estimation and forecasting

Value	Value of exudates in US$			Exchange rate		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**
Birr	25251703	23495856	36582710	2.07	2.07	8.314

14.4 Data for National reporting table T14

FRA 2005 Categories	**Value of the of NWFP removed (1000 USD)**		
	1990	**2000**	**2005**
Plant products / raw material 1. Food			
2. Fodder			
3. Raw material for medicine and aromatic products			
4. Raw material for colorants and dyes			
5. Raw material for utensils handicrafts & construction			
6. Ornamental plants			
7. Exudates	25 252	23 496	36 583
8. Other plant products			
Animal products / raw material 9. Living animals			
10. Hides skins and trophies			
11. Wild honey and bee-wax			
12. Bush meat			
13. Raw material for medicine			
14. Raw material for colorants			
15. Other edible animal products			
16. Other non-edible animal products			
TOTAL			

14.5 Comments to National reporting table T14

15 Table T15 – Employment in forestry

15.1 FRA 2005 Categories and definitions

Category	Definition
Primary production of goods	Employment in activities related to primary production of goods, like industrial roundwood, woodfuel and non-wood forest products.
Provision of services	Employment in activities directly related to services from forests and woodlands.
Unspecified forestry activities	Employment in unspecified forestry activities.

15.2 National data

15.3 Data for National reporting table T15

FRA 2005 Categories	Employment (1000 person-years)	
	1990	2000
Primary production of goods	ID	ID
Provision of services		
Unspecified forestry activities		
TOTAL	**ID**	**ID**

15.4 Comments to National reporting table T15

Country reported insufficient data, however, according to “Trends and current status of the contribution of the forest sector to national economies”(FAO, 2003), employment in forestry, logging and related services for Ethiopia is reported 1 893 and 2 093 persons for 1990 and 2000 respectively. These figures are estimates based on the current production of industrial wood and are thus considered to be underestimates.

16 Thematic reporting tables

If countries would like to submit additional reporting tables, these should be included here. (See the chapter on thematic reporting in the Guidelines for Country Reporting).